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DOI

<https://doi.org/10.1080/00207543.2018.1449976>

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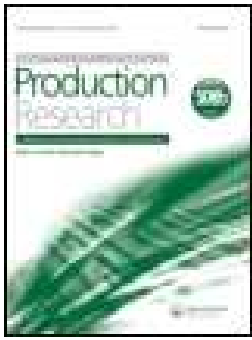
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To cite this article: Mihalis Giannakis, Desmond Doran, Darren Mee, Thanos Papadopoulos & Rameshwar Dubey (2018): The design and delivery of modular legal services: implications for supply chain strategy, International Journal of Production Research, DOI: [10.1080/00207543.2018.1449976](https://doi.org/10.1080/00207543.2018.1449976)

To link to this article: <https://doi.org/10.1080/00207543.2018.1449976>



Published online: 16 Mar 2018.



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The design and delivery of modular legal services: implications for supply chain strategy

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(Received 4 May 2017; accepted 18 February 2018)

We explore how professional legal services and their supply chains can be modularised. Based on a review of the service modularity, supply chain modularity and supply chain strategy literature, we posit that the scope of service modularisation should be determined by, and aligned with, the supply chain strategy of a firm. We develop a conceptual framework that links the service and supply chain modular architectures with the supply chain strategy of service firms. The framework provides the foundation for an empirical confirmatory analysis through in-depth multiple case studies in 10 law firms in the UK. We identify the current status quo of service and supply chain architectures of professional legal services and then explore several options for their modularisation. Our findings show that legal services are currently over-customised, offering significant opportunities for the application of modularity across their supply chains. We generate insights to show how service modularity can be applied to the service offering, processes and supply chain levels of law firms. We also demonstrate the effects of each level of modularisation on the selection of appropriate interfaces and on the decomposability of services.

Keywords: service modularity; service supply chain strategy; legal services; empirical case study

1. Introduction

A key challenge facing professional service providers is their ability to respond rapidly to customer demand and to simultaneously provide a personalised experience (Wang et al. 2011; Mendes et al. 2012; Shen et al. 2017). However, the cost associated with personalised services is often prohibitive for professional service companies (Anderson, Fornell, and Rust 1997). A successful strategy for overcoming this trade-off between cost and customisation is the use of *modular* service architectures (Jacobs, Vickery, and Droge 2007; Vickery et al. 2016).

The architecture of a service refers to the way that its functionalities are decomposed into individual functional elements and how these elements are connected to provide the overall service (Voss and Hsuan 2009). A modular service architecture involves the decomposition of service elements into standardised service components (modules) that are linked through standard decoupled interfaces and that can be combined to generate customised service offerings (Mikola 2006). This contrasts with an integral service architecture in which the decomposed elements of service functionalities do not create standard components (service processes) and/or are linked via coupled and non-standard interfaces (Ulrich 1995).

Modular service architectures may be a necessary, but not a sufficient condition for attaining the benefits of modularity (Schilling 2000; Sako 2003; Voordijk, Meijboom, and de Haan 2006). Fine (1998) posits that organisations should align the degree of modularity of their offerings with the degree of their supply chain modularity, that is, the degree of flexible and interchangeable relationships that exist between companies in a supply chain (Chang and Yeh 2013). If there is a mismatch, the modular design strategy will fail, as the final offering will not yield the desired flexibility (Fine 2005). Therefore, modular service architectures should be determined by appropriate supply chain architectures – the way that supply chains are set up, governed and coordinated (Sanchez and Mahoney 1996).

The benefits of modularity have been documented across different industries and organisational settings for the design and production of tangible goods (Baldwin and Clark 1997, 2000; Vickery et al. 2015). However, there is still limited research relating to the application of modularity in services (Brax et al. 2017), and in particular, professional services (Machuca, González-Zamora, and Aguilar-Escobar 2007; Nätti, Ulkuniemi, and Pekkarinen 2017). Professional services provide an exemplary locus to study the scope of service modularisation. They are characterised by high customer contact, high variety and low capital intensity (Silvestro et al. 1992). More importantly, the level of tangible

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resources in professional services is limited, making them a distinctive context for the application of the principles of modularity compared to the context of manufactured products.

The literature focussing on service modularity is still in its infancy. Existing studies explored the potential applicability of modular designs in service contexts (Bask et al. 2011), the design of modular service architectures (Voss and Hsuan 2009), the role of the customer in modular service design (De Blok et al. 2010), and generated typologies for the role that interfaces play in service customisation (De Blok et al. 2014). However, research that explores the interplay between the scope of service modularisation and supply chain strategy is presently lacking. From the service supply chain management perspective, this is particularly relevant, as the fit between service design and supply chain strategies can lead to improved operational performance and delivery (Roth and Menor 2003; Gualandris and Kalchschmidt 2013; Slack and Lewis 2015).

Against this contextual backdrop, we explore how modular professional services can be created and how the supply chain strategy of professional services organisations determines the scope and degree of service modularisation. We aim to develop a clear understanding of the drivers and mechanisms of professional services modularity and to demonstrate how any attempt to modularise services needs to be aligned with the supply chain strategy of a firm.

The context of our study is the legal services sector. Legal services firms present a befitting setting from which to explore the potential of modular services design. They provide typical professional services characterised by a high knowledge intensity, a professionalised workforce and low capital intensity. Moreover, they draw on common bodies of regulated knowledge and standards (Lewis and Brown 2012). The legal services sector in most developed economies is currently facing significant challenges brought about by demanding economic conditions and regulatory changes. As accurate information becomes more easily available online, barriers to entry in established markets diminish. The changing social and technological trends have led to the growing dissatisfaction with the traditional ‘bill by the hour’ model (State Bar of Wisconsin 2014; Mandel 2017). These challenges have prompted law firms to reconsider their business models and the way they design and deliver their services so that they can compete effectively in a rapidly changing and increasingly cost-focused environment (Susskind 2010). When redesigning legal services, it is essential to move away from an unstructured provision of services that is characterised by the transfer of specialised knowledge of highly skilled lawyers to clients, who deliver the service in a highly personalised and often high-cost manner.

We structure the remainder of the paper as follows: In Section 2, we discuss salient principles of service modularity, supply chain modularity and service supply chain strategy, and describe the current legal services business environment to contextualise our study. Based on a critical reflection on the pertinent literature, we develop a modular service supply chain strategy conceptual framework that drives our empirical inquiry about how to modularise legal services. In Section 3, we present our research design and methods, and provide a detailed presentation of our findings in Section 4. In Section 5, we discuss the implications of our study for theory and practice. We conclude the paper with a summary of the key findings and limitations of our study and an agenda for future research.

2. Literature review

2.1 *Service modularity – levels, degree, and interfaces*

The application of modularity in the service sector is presently limited despite the growing awareness that it could be a robust approach to low-cost delivery of services that require high degree of customisation (Meyer and DeTore 1999; Bask et al. 2010; De Blok et al. 2014; Brax et al. 2017; Frandsen 2017). Pekkarinen and Ulkuniemi (2008), for example, refer to service modularity as a way to manage heterogeneity in demand. Voss and Hsuan (2009) contend that the lack of research in service modularity may be due to the heterogeneous character of services, the role that people play and the often personalised nature of service episodes and encounters. The design and development of modular services necessitate that service processes can be separated, delivered independently and re-combined without adverse operational impact. For professional service providers, this is likely to be challenging since it requires a significant change to the way that services are provided. More importantly, it necessitates a redesign of the existing architecture and operational processes at the supply chain level.

Drawing on several typologies that have been used in extant studies (Campagnolo and Camuffo 2010; Bask et al. 2011; Rahikka, Ulkuniemi, and Pekkarinen 2011), we consider that service modularisation can take place at three hierarchical levels:

- *Modularity in service offerings*: This type of modularisation refers to defining the design boundaries of a service and its constituent components so that design features and tasks are interdependent across modules. Modular services offerings are pre-packaged service bundles that customers can choose from. These service modules can be mixed and matched by customers as they are linked via standardised interfaces (Voss and Hsuan 2009). An

example of modular service design can be found in higher education programmes, where students can combine different modules (courses) that are linked through a standardised credit system and learning objectives (interfaces). Each of these modules requires different skills, educational tools and processes.

- *Modularity in processes*: These are standardised service processes that are conducted and delivered independently by skilled personnel and then combined to produce customisable services as a whole, to achieve maximum flexibility. A call centre with an Interactive Voice Response (IVR) system in which clients answer consecutive standard questions and are routed to the right person to provide them with specialised assistance is an example of process modularity. Using the higher education example from above, depending on the type of degree sought by students, a module can be delivered through a combination of standard learning processes – lectures, seminars, workshops that can be provided online, face-to-face, or in a blended fashion. In legal services, process modularity could be potentially applied in the drafting of Wills. With this method, consecutive and standardised modular processes with the use of an online interface can be established as follows: (i) all clients answer a series of pre-defined questions to determine the complexity of the Will they require; (ii) staff resources are allocated using a standard protocol based on the complexity of the Will, as defined in the previous process; (iii) contractual details are completed; (iv) the Will is digitally stored and physically dispatched to the client; and (v) payment is processed, reflecting the choices made in the preceding steps.
- *Modularity in supply chains*: This modularisation type involves the organisational processes, governance structures and contracting procedures that are used to accommodate modular service provision. It pertains to the manner in which a firm co-designs and co-delivers services in collaboration with loosely coupled organisations, while having the flexibility to use resources from outside its boundaries to provide services to customers. In the higher education example, a university may source the delivery of teaching to specialist external independent lecturers, partner with other universities and/or rely on lecturers from other internal departments. Modularity in supply chains is key to *commonality sharing* – a fundamental feature of modularity that refers to the use of the same version of a service module across multiple services, made possible by one-to-one mapping and defined decoupling points.

All of these levels of modularity may have resonance for professional legal services where there is potential to divide their design into distinct elements and to use and recombine such elements dependent upon individual customer requirements and the service package offered.

The degree of coupling that the service should have is equally important to the decision to modularise a service to any (or all) of the levels. The degree of coupling indicates how tightly or loosely coupled the constituent components and interfaces of a service architecture are (Voss and Hsuan 2009). This, in turn, is related to the *degree of customisation* that is required by customers. Bask et al. (2011) developed a useful matrix in which different customer service offerings, service processes and service supply chains could be analysed with respect to both the degree of modular design and required customisation. This categorisation resonates with the context of professional service firms that provide high variety/high volume of services, where elements of the services are common to a high percentage of service encounters, while seeking to retain an element of customisation for premium customers.

A fundamental tenet of modular service design is also the notion of *interfaces* (De Blok et al. 2014). Interfaces describe the way in which two components or service providers interact in a modular system. They consist of distinctive and intangible interactions, which are manifested in the role of people, IT processes and procedures and information flow patterns. Pekkarinen and Ulkuniemi (2008) contend that, in modular services, interfaces accommodate and enable substitution and exchange of components. Interfaces can be determined by mapping the service supply chain and delivery (often, but not exclusively, consisting of internal service suppliers) and establishing the necessary handover points. These handover points are the service delivery interfaces and may involve human and/or digital transition from one element of the modular service to the next. In the context of professional legal services modularisation, such interfaces could potentially be applied to simple as well as more complex legal services, which may involve routine elements and aspects of one-to-one specialised service provision.

2.2 Supply chain modularity and service supply chain strategy

In much of the existing literature on modularity, authors argue that modular product designs should be developed by modular supply chains (Baldwin and Clark 1997, 2000; Fine 1998, 2005). This rationale is rooted in the *mirroring hypothesis* (Colfer and Baldwin 2010), which postulates that the standardisation of the elements, processes of modular products and the interfaces that connect them limits the need as well as the opportunity for partnering organisations in a supply chain to develop high levels of interaction. Therefore, modular (loosely coupled) supply chain architectures are more appropriate.

However, this hypothesis may be problematic in service contexts. A fundamental tenet of service management is that value is co-created jointly between a customer and a supplier (Vargo, Maglio, and Akaka 2008; De Blok et al. 2010). In a professional services context, a high degree of interaction usually exists between suppliers and service buyers, due to the intangible nature of the services and the fact that clients possess much of the information needed to develop the service (Bettencourt et al. 2002). As a result, close relationships between the service supply chain partners are established. Due to the complex nature of professional services concerning the design of the service elements, as well as the degree of interaction with clients and suppliers, the modularisation of professional services and the necessary degree of supply chain modularity is not as straightforward as the mirroring hypothesis purports.

Therefore, for the design of modular professional services, an antithetical postulate to the mirroring hypothesis can be developed, regarding the formulation of loosely coupled supply chains. We believe that this merits further investigation. More specifically, an in-depth understanding of how and to what degree to modularise professional services, as well as determine the relationship between the service and supply chain modularity, is lacking.

2.2.1 Supply chain modularity

Supply chain modularity refers to the degree to which specific standard activities are assigned to organisations outside the governance structure of a firm (Schilling 2000; Brusoni, Prencipe, and Pavitt 2001). In modular supply chain architectures, supplier organisations are geographically and culturally dispersed, have few close organisational ties and are independent of the firm in that they have an autonomous governance structure (Fine 1998). However, they are interdependent with the firm in that they interact and coordinate their activities for the creation of goods and services offered to customers (Karim 2006).

Based on this definition, the degree of service supply chain modularity is related to the degree of outsourcing and the generation of interfaces between the collaborating organisations. The degree of outsourcing is a necessary, but not a sufficient condition for modular supply chains, as it does not axiomatically imply high-level independence between the collaborating firms (Sako 2003). For example, a company may outsource a large part of its transformation processes to third parties, but impose integrative mechanisms in the interaction with them, to enhance their level of interdependence with it. This differentiation leads to the notion of two archetype forms of modular service supply chain architectures: loosely coupled modular service supply chains with independent organisations and tightly coupled modular service supply chains with highly interdependent organisations (Sanchez and Mahoney 1996).

By taking into account the reciprocity between a modular service architecture and a modular supply chain architecture, we can consider a professional services organisation that currently delivers an integral service, which is created by integrated and tightly coupled supply chains (depicted in the bottom left quadrant in Figure 1). If the organisation considers migrating to the delivery of modular service, it has three strategic options:

- developing modular service designs but producing them in-house (top left quadrant)
- outsourcing non-modular service elements, but maintaining a highly interdependent supply base that goes beyond the first tier of supply (bottom right quadrant)

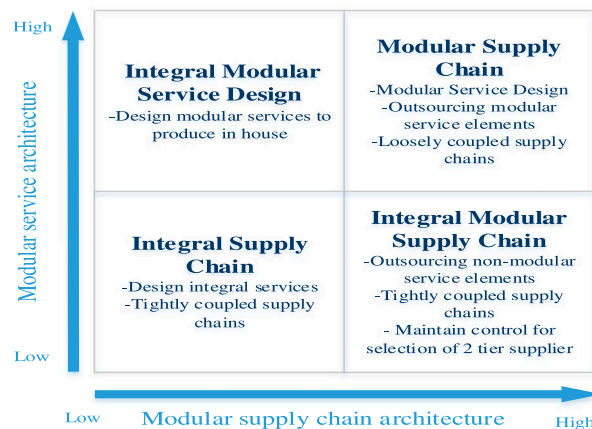


Figure 1. Modular strategies based on service and supply chain architectures.

- developing modular service designs and outsourcing them to suppliers in a highly loosely coupled supply chain (top right quadrant).

It is evident from the above considerations that, although service modularity increases the drive for outsourcing, the decision for service modularisation should be considered separately from the decision to outsource and the choice of the best type of service supply chain architecture.

Which of the three strategic choices for the degree of supply chain modularity will be appropriate for different types of professional legal services and how can they be modularised accordingly? We posit in this study that this will depend on the actual supply chain strategy of a professional service organisation.

From the process management perspective, supply chain strategy is the set of decisions that aim to integrate the processes of supply chain members. It extends the operations strategy approach, across the network of companies in a supply chain (Harland, Lamming, and Cousins 1999). Using the definition of rational operations strategy provided by Slack and Lewis (2015), we define supply chain strategy as the total pattern of decisions that shape the long-term capabilities of companies in a supply chain and their contribution to overall strategy, through the reconciliation of market requirements with supply chain resources.

The operationalisation supply chain strategy is dependent upon the overall positioning of the focal organisation. This is often represented by how key performance objectives of a company influence decisions across several supply chain areas (Harland, Lamming, and Cousins 1999). Typical performance objectives discussed in the operations and supply chain literature involve supply chain *quality, dependability, speed, flexibility* and *cost* (Slack and Lewis 2015). Typical service supply chain decision areas involve sourcing and service network design, capacity decisions, level of client contact and service delivery strategies, choice and management of design and delivery processes and technology used, and decisions related to the way supply chains are developed (Giannakis 2011). The performance objectives and the supply decision areas can be combined to provide a decision-making matrix for services supply chain strategies (Figure 2).

We utilise this template matrix in our empirical study to explore the intersections between the performance objectives and the supply chain decision areas, which assist in the achievement of such performance objectives for the design of modular services. For example, if service quality is a key performance objective, the organisation needs to determine which decision areas are crucial to the maintenance of quality. For exemplary professional services, such as legal services, it is likely that the intersections ‘quality/client contact’ and ‘quality/organisation & development’ will be more important (Silvestro et al. 1992). However, for some legal services that do not require high customer contact and the client is likely to value low cost, the intersection ‘cost/process & technology’ will be prioritised by companies. Therefore, the intersections will depend upon the importance attached to each of the performance objectives by the customers of the service providers.

The selection of the type of modular service supply chain architecture is dependent upon several factors. For example, Caridi, Pero, and Sianesi (2012) contend that the level of innovativeness is necessary for certain business environments and this may facilitate selection of the most appropriate modular supply chain architecture. Highly innovative products are better designed and created by integral supply chains, whereas modular supply chains are more suitable for derivative products. We propose that the performance objectives of a service company will condition the selection of the most appropriate modular service design and supply chain strategies.

		Legal Services Supply Chain Decision Areas					
		Capacity strategy	Sourcing strategy	Process choice	Technology	Client contact	Service delivery strategy
Supply Chain Performance Objectives	Quality						
	Actual output (conformance)						
	Perceived quality (soft issues)						
	Service delivery (expectations)						
	Dependability						
	Availability / Consistency						
	Flexibility						
Responsiveness / Adaptability / Variety							
Speed							
Timely completion							
Cost							
Value for money / Process efficiency							

Figure 2. Services supply chain strategy matrix.

2.3 Context of the empirical study – legal services sector

Legal services are classified as professional services. However, in the wide range of legal services that presently exist, two very different operating models are adopted: the traditional, bespoke approach that is used to deliver complex services requiring a high degree of customisation (such as corporate law, litigations, mergers and acquisitions support) and the standardised, service-factory approach, used to deliver commoditised services (such as wills, personal injury claims, or residential conveyancing).

In their well-cited industry report exploring the trends and issues facing the UK legal market, Hodgart Associates (2014) note that providers need to reconsider these two classic business models, explore the need for increased market segmentation and manage to deliver cost-effective services in a buyer-driven market. This poses a strategic challenge for legal service providers, as they need to design service offerings and their associated supply chain architectures in a way that can balance the demanded levels of cost-effectiveness and operational efficiency, while ensuring the required level of service personalisation (Susskind 2010; Talluri, Kim, and Schoenherr 2013).

2.3.1 Outsourcing of legal services

Outsourcing parts of the value-added processes to key suppliers is a well-established strategy that has been applied in many industries. Global corporations facing rising legal fees and law firms facing growing pressure to become more international have been demanding legal process outsourcing models for some time (Empson 2007). Sako (2015) argues that the rationale for outsourcing legal processes is grounded in the structure of the value chain of a typical law firm, which involves a fundamental three-step process: knowledge and information management, consultative advice and representation and client relationship management. Sako (2015) further posits that the knowledge and information management aspects of legal services can be separated by ownership and geography from other aspects of the legal service delivery process and delivered outside the boundaries of the firm at a lower cost. She points to significant benefits of outsourcing legal services, such as improvement in *profit per partner* (a commonly used law firm performance metric), substantial cost reduction, and the potential to open up a latent market of clients who had previously been unable to afford legal services (the ‘long tail’ often witnessed in the current digital-enabled era).

Despite the drive for increased outsourcing and modularisation of legal services, Regan and Heenan (2010) and Sako (2015) provide potential explanations for the slow transition of legal services into more modular designs. According to these authors, these involve the lawyers’ perception of the prestige of their work and resistance to change, the notion of partners’ autonomy to make make-or-buy decisions, the ‘billable hour’ acting as a disincentive to lower costs, the partnership model with distributed authority that implies that decisions to outsource or offshore are typically taken at the decentralised level, and the difference between actual and anticipated regulatory change.

According to Susskind (2010), legal services have historically evolved over a continuum. Traditionally, they were delivered as bespoke services, and have progressively become standardised and systematised packages. He further posits that, in the future, they will become fully commoditised ‘products’. Susskind’s prediction of the evolution of legal services, however, makes no distinction between different legal services types. His analysis does not elucidate how services that have common characteristics could be optimally delivered using a similar approach. Instead, his inference is that, over time, all services will be delivered in a homogenous manner. We argue that, to identify the optimum legal services delivery method, both the service design and the supply chain strategies of legal services must be considered. Our contention is grounded in the resource-based view of the firm, according to which, ensuring a match between the type of service being delivered and the way that it is created and delivered is the primary objective of any strategic decision (Silvestro et al. 1992; Kellogg and Nie 1995).

Notwithstanding the potential benefits of outsourcing, modular service architectures can multiply organisational design options through configuration and reconfiguration of independent modules (Baldwin and Clark 2000). For example, supply chain modularity could help law firms to realise economies of scale by centralising standardised modular service processes into shared service centres (legal process delivery centres) or even virtual working environments. At a high degree of supply chain modularity, a law firm can source its processes through a globally dispersed network of vendors (Sanchez and Mahoney 1996).

2.4 Conceptual model

When determining the appropriate level and degree of legal services modularity, the different types of legal services should first be classified in a meaningful manner, as this would assist in choosing the scope of modularisation. In the service management literature, there is a profusion of service typologies according to several dimensions, such as the

degree of customer contact (Silvestro et al. 1992), labour intensity (Schmenner 2004), routinisation of processes (Wemmerlöv 1990), equipment/people focus and employee discretion to make decisions (Silvestro et al. 1992). Tinnilä and Vepsäläinen (1995) provided an instrumental typology according to the degree of service customisation. They classified services into the following categories:

- *Mass transactions*: These are simple services with few options and little customisation of the terms of delivery carried out by routine tasks. Typical examples of legal services include *personal injury claims*, *conveyancing*, and *Will & Probate*
- *Standard contracts*: These services may involve complex specifications but are not extensively adapted to an individual customer. A standard contract would specify the options and application to the customer. *Property transactions*, *family law*, *commercial contracts*, *employment law*, *professional negligence* and *tax* fall into this category.
- *Customised delivery*: These are services tailored to individual customers involving some uncertainty. Typical examples include *intellectual property*, *litigation* and *dispute resolution*.
- *Contingent relationships*: These services involve complex problems, several interrelated activities and intensive communication, e.g. *mergers & acquisitions*.

In the pertinent literature, service modularity is presented as a promising strategy for addressing the challenge of efficiently delivering customisable legal services. Based on our proposition that the key performance objectives of a firm and its supply chain strategic decisions should determine the choice of the level and degree of service modularity, we develop a guiding framework to match different legal service types and their supply chain architectures to service delivery processes (Figure 3). We use this conceptualisation in our empirical study to explore how legal services can transition from traditional to modular service designs.

The framework follows the following sequential process:

- First, the key performance objectives of a particular service are identified, and the appropriate supply chain strategy is determined with respect to capacity, sourcing, process choice and delivery plans.
- The service process characteristics are matched to appropriate modular service architectures.
- Finally, the choice for the required modular supply chain architecture is made.

For example, if face-to-face, intensive client contact is necessary to maintain the service quality expected by customers, this will imply the need for a broad and flexible job design, a short-fact process, limited outsourcing and fixed capacity strategy, along with the use of centralised outlets for its delivery. This service operation setting is characterised by a low level of process standardisation through tightly coupled non-modular processes. Integral service and supply chain architectures and integral modular supply chains are the two options that a company can choose to deliver the service. However, if high responsiveness is needed to meet unpredictable demand, a flexible capacity strategy for allocating staff to client requests rapidly needs to be adopted. This can be achieved through outsourcing certain service elements

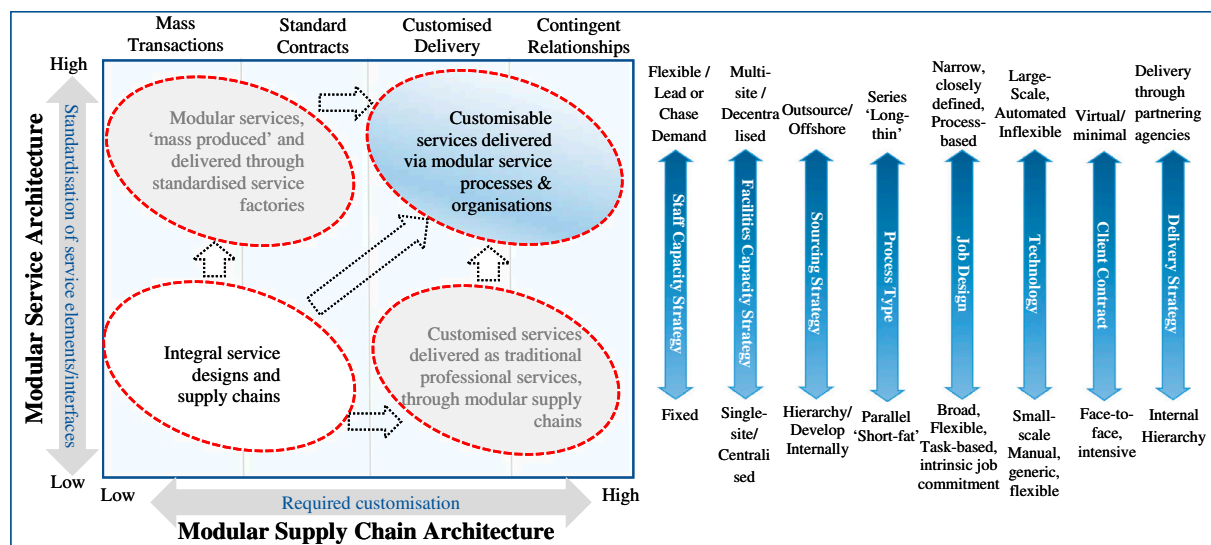


Figure 3. Framework for the selection of modular legal service design and delivery.

and using online facilities to contact customers. This approach requires a high level of process standardisation that can be achieved by loosely coupled processes and supply chains. Services can be modularised at the offering and process levels and produced in-house (integral modular design) or through modular supply chains.

3. Methodology

As our study is exploratory in nature, it is essential to obtain in-depth information about the supply chain strategies and the service design processes of specific legal service firms, so that we can generate insight into the design and delivery of modular professional services. Because of the lack of conceptual and empirical research on the design of modular legal services, we adopted a multiple case-based research design (Yin 2013). Case study research enables the exploration of a phenomenon in its real context and allows for the development of propositions and associated frameworks based on the analysis of primary data.

Voss (2009) argues that a detailed study of focused, representative cases that can elucidate critical variables pertinent to the phenomenon under investigation is appropriate. Consistent with this idea, we selected cases based on the logic of literal replication. We chose to study legal services with both similar and different characteristics, in order to analyse predictably similar or predictably dissimilar results regarding how legal services can be modularised. Ten case studies (law firms) were selected that are similar in the following aspects: (i) they design and deliver a diverse number of legal services, (ii) they have established routines and processes for the design and delivery of legal services and (iii) they all operate in the UK (facing similar regulatory and economic challenges).

We intentionally chose legal firms that operate in B2B and B2C environments and have different turnovers (Table 1). Both types of firms (B2B and B2C) had to be included, as the customer orientation influences the process design (Alam and Perry 2002).

We collected qualitative data and followed an inductive approach in the analysis. Initially, we carried out 30 semi-structured interviews, which focused on the current state of the firms' service supply chain strategy and approach to service design and delivery. We subsequently conducted 10 s round interviews with senior executives of the participating firms, to explore the extent to which modular service designs can be developed. These second-round sessions also included a process analysis workshop in two firms, the aim of which was to design two legal processes in a modular fashion. We interviewed only senior managers of the selected firms that are responsible for making strategic supply chain decisions and have direct responsibility for the provision of their services. Their positions in the firm included managing partner, chief executive officer, chief operating and procurement officer, and finance director. The interviews lasted 1–2 h. We triangulated the interviews by reviewing relevant documentation, such as process descriptions, documents that describe several aspects of the companies' service supply chain strategies and service quality manuals. This approach accommodated our desire to determine the relationship between operating efficiency and service quality explored by Talluri, Kim, and Schoenherr (2013).

Each initial interview covered three major areas: (i) determination of the predominant performance criteria for each firm, (ii) an examination of the strategic choices related to the firm's service supply chain decision areas, and (iii) how legal services are currently designed and delivered. The questions were predominantly open-ended to enable interviewees to respond in their own words. The interviews were recorded and transcribed verbatim. The collected data were subsequently analysed to identify any emerging themes and patterns.

Table 1. Case studies – firm characteristics.

Alias	Size (income)	Predominant customer type	Predominant service (by level of customisation)
Firm A	£101–£500 m	B2B	Customised delivery
Firm B	£101–£500 m	B2B	Customised delivery
Firm C	Less than £100 m	B2C	Mass transactions
Firm D	Less than £100 m	B2C	Mass transactions
Firm E	More than £500 m	B2B	Contingent relationships
Firm F	More than £500 m	B2B	Customised delivery
Firm G	Less than £100 m	B2C/B2B	Customised delivery
Firm H	Less than £100 m	B2C	Standard contracts
Firm I	Less than £100 m	B2B	Contingent relationships
Firm J	£101–£500 m	B2B	Customised delivery

4. Analysis and findings

The unit of analysis was each legal service that is provided by the selected firms. We utilised our proposed conceptual framework (Figure 3) in a three-step analytical process. First, we identified the service supply chain strategy of each company, and then determined and classified the existing mode of service design and delivery. These steps enabled the determination of the most appropriate modular strategy for each service. In the final step, we applied service modularity principles to propose how selected types of legal services currently being delivered in a non-modular fashion could be modularised. Each step involved the following inductive process: (i) analysis of interview transcripts and observation notes, (ii) analysis of emerging themes and initial categorisation (coding), (iii) in-depth analysis, comparing substantive findings with related concepts in pertinent literature to generate themes and to identify relationships, (iv) discussion of the analysis results with a sample of the interviewees and (v) to ensure the validity and reliability of the study, the results were presented to the participating companies to be corroborated by senior managers (Miles and Huberman 1994).

4.1 Identification of existing supply chain strategic decisions of law firms

We conducted a within-case analysis to identify the supply chain strategy decisions of each law firm and measure their performance against the selected performance criteria, using data from the first round of interviews. We categorised responses related to legal-specific performance criteria according to the standard performance criteria for service processes (Figure 2). The analysis of responses related to the supply chain decision areas was iterative and followed a combination of inductive and a priori coding. The interview transcripts were reviewed to identify commonly occurring themes. These themes were then compared to the existing theoretical concepts to identify relevant methods of codification. The responses were subsequently reduced into codified responses and categorised with respect to the supply chain strategy decision areas accordingly. As an example, some interviewees cited the importance of ensuring that staff was 'suitably utilised', or noted that they did not have too many staff 'sat on the bench'. This prompted a review of capacity management models, where classification variables – such as *leading* or *lagging* capacity building approaches, *fixed* or *flexible* capacity bases and *passive* or *active* capacity scheduling plans – were identified (Slack and Lewis 2015). This approach led to the emergence of detailed strategic supply chain decisions for the selected firms. Once completed, the two components were combined and incorporated into the developed legal services supply chain strategy matrix (an example of the within-case analysis is shown in Appendix 1). Subsequently, we conducted a cross-case analysis to aggregate the findings related to all the supply chain strategic decisions for all firms. Table 2 summarises the findings and illustrates the key trends, i.e. the percentage of companies in the supply chain strategy decisions.

Despite the range of different sizes and types of firms, Table 2 demonstrates the predominance of common service supply chain strategic decisions. The detailed performance criteria and detailed supply chain strategy decisions enabled the matrix to be further refined and developed.

4.2 Identification of existing legal services design and delivery models

We conducted a within-case analysis to identify the existing service design and delivery models of the studied law firms. First, we established the required degree of customisation for each firm's predominant legal service (shown in Table 1), using the typology proposed by Tinnilä and Vepsäläinen (1995). Subsequently, we plotted the categorised interview data for each firm's process design model onto a specifically-designed Excel form, to visually display any firm-specific trends in the data (an example is included in Appendix 2). Using our proposed conceptual framework, we consolidated the data from all interviewees onto a *customisation/standardisation matrix* to identify the existing practice for the service and supply chain architecture of each firm (Figure 4(a)). Finally, we conducted a cross-case analysis to identify how legal services are collectively designed and delivered across all firms (Figure 4(b)).

The analysis depicted in Figure 4(a) shows that 7 of the 10 sampled law firms deliver services in a manner that is 'over-customised' compared to the degree of customisation required, i.e. they are 'above the diagonal line of fit' of the model. The analysis for each of the legal services in all firms revealed similar results (Figure 4(b)). Despite varying degrees of required customisation (except for mass transactions), almost all legal services are delivered as non-standardised 'professional services' with non-continuous process flows. Typically, only small-scale flexible technology is used, and often as a means of recording information rather than as a means of automating the service.

Table 2. Cross case analysis – percentage of responses to key service supply chain decisions areas.

Decision areas	Detailed supply chain decisions	
Capacity strategy	<i>Staff capacity</i>	<ul style="list-style-type: none"> • Capacity building (100% Capacity lagging) • Capacity flexibility (100% Fixed capacity) • Capacity scheduling (80% Passive/20% Active) • Structure (80% Pyramidal/20% Functional) • Contract terms (100% Full time)
	<i>Facilities and office capacity</i>	<ul style="list-style-type: none"> • 90% Multi/10% Single Site • 80% City centre/20% High street/0 Virtual • 90% Centralised/10% Decentralised
Sourcing Strategy	<i>Core legal process sourcing strategy</i>	<ul style="list-style-type: none"> • 90% In-house/10% Mixed/0% Outsourced • 90% Onshore/10% Mixed/0% Offshore
	<i>Back office/Support services</i>	<ul style="list-style-type: none"> • 100% Office based • 90% In-house/10% Mixed/0% Outsourced • 90% Onshore/10% Mixed/0% Offshore
Process Choice	<i>Process type</i>	<ul style="list-style-type: none"> • 80% Customised/20% Standardised/0% Modular. • 80% Diverse/20% Repeated
	<i>Process configuration</i>	<ul style="list-style-type: none"> • 70% Small Scale/30% Large Scale • 80% Long-thin/20% Short-fat
Technology Strategy	<i>Technology</i>	<ul style="list-style-type: none"> • 70% For recording/30% For automating • 30% Flexible/70% Inflexible
Client contact	<i>Client contact strategy</i>	<ul style="list-style-type: none"> • 80% Face to face/20% Telephone
Delivery strategy	<i>Channel strategy</i>	<ul style="list-style-type: none"> • 60% Internal hierarchy/30% Agents & alliances/10% Market network

4.3 How can modularity be applied to legal services

To answer this question, we used the data obtained during the second round of interviews and the workshop. We explored how two legal services could be designed as modular services. We analysed the responses given in the interviews in relation to service modularity principles (decomposability, interfaces, commonality sharing) and then classified them accordingly. The data were categorised in an a priori manner to confirm the scope of modularity at the service offering, the process and the supply chain levels (Bask et al. 2011). This analysis was conducted using the sequential method proposed by Asan, Polat, and Serdar (2004), combined with value stream and process mapping analyses. In addition to the interviews and the process workshop, we conducted extensive online research to identify law firms that provide modular solutions.

4.3.1 Modularity at the service offering level

Our data indicate that none of the 10 sampled firms offer modular services. Service offerings are based either:

- on integral service designs with a low level of outsourcing and with few integrated options for the customer (such as personal injury), or
- on integral modular designs (traditional bespoke legal services). These are bespoke services with some level of outsourcing but with tightly coupled supply chains (e.g. litigation). For this option, the customisation extends to the early stages of service creation, for example outsourcing only information system interfaces.

During the workshop, we identified that the design and deployment of regular modular offerings can be enabled. In addition, it could be driven by the rapidly changing digital information system innovations for the design of ‘self-service’ and ‘automated’ services that can be delivered as online mass transactions. In collaboration with the participating managers, we generated a template for the creation of modular service offerings. The example provided in Figure 5 shows how modular estate planning legal service packages can be designed by combining a bundle of standard wills and trusts documents that can be purchased independently, or as a complete offering. With this modular design, cus-

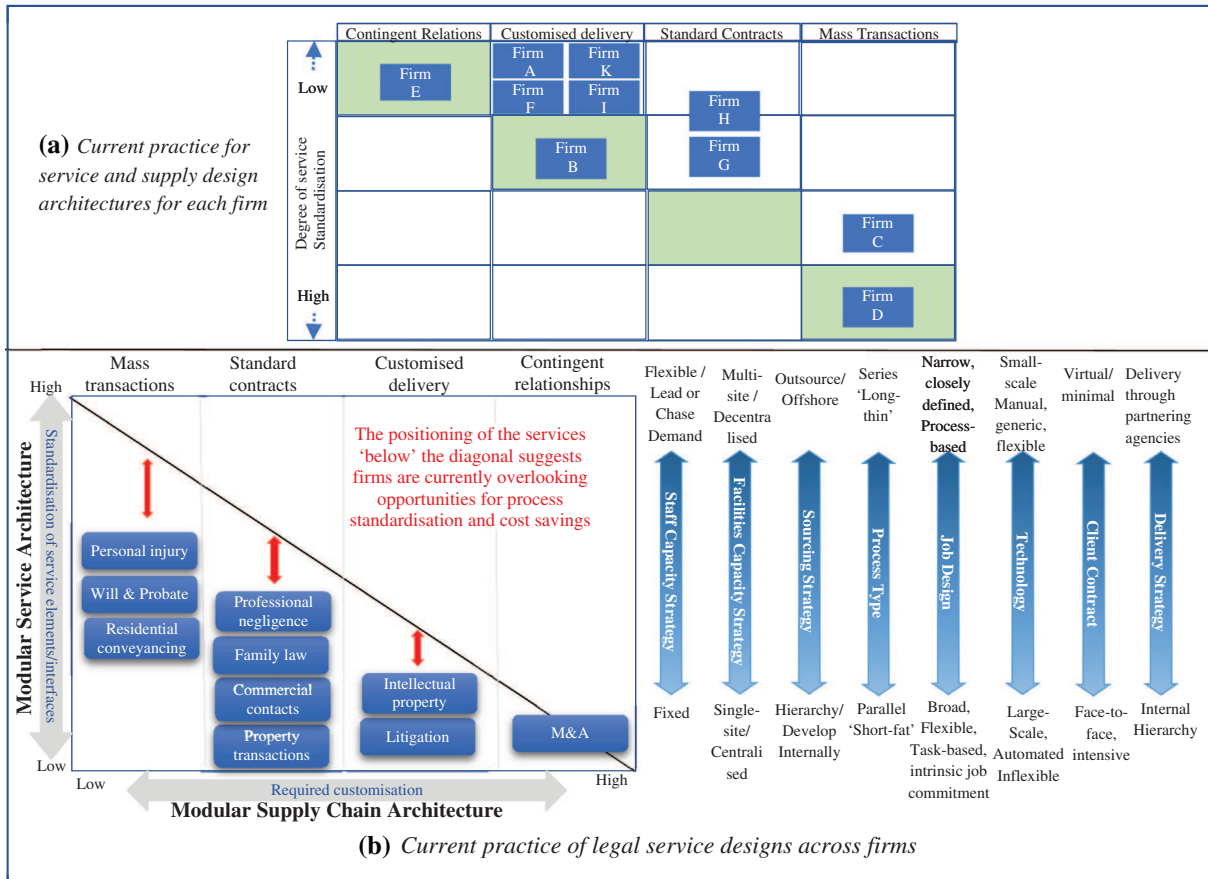


Figure 4. Current status of organisational and legal service design architectures.

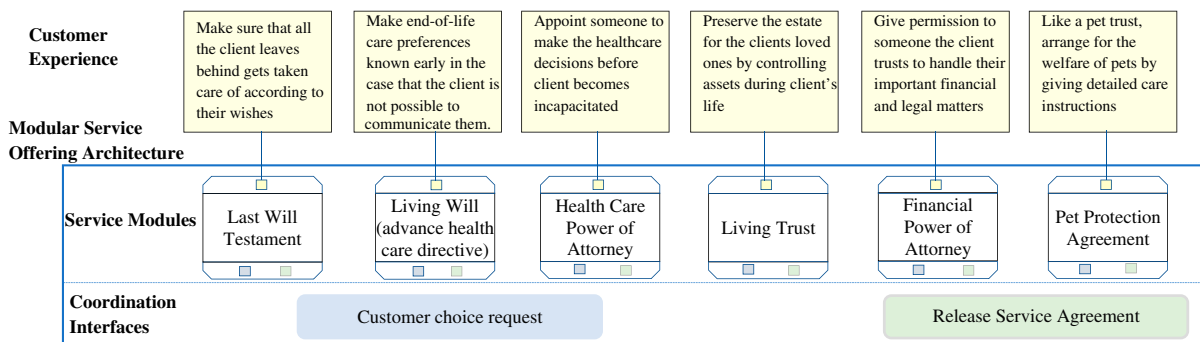


Figure 5. Modular estate planning service offering.

tomers can 'connect' the different service modules via standard online user interfaces that enable them to choose from different options and then 'combine' these service modules into a final service agreement.

4.3.2 Modularity at the service process level

Similar to modular service offerings, we found that none of the companies use service process modularity principles. Make-to-stock service processes are commonly used to deliver non-complex legal services that require a relatively low degree of customisation (commoditised processes). Similarly, engineer-to-order processes are widespread, and are used to deliver complex legal services that require a high degree of customisation (bespoke processes).

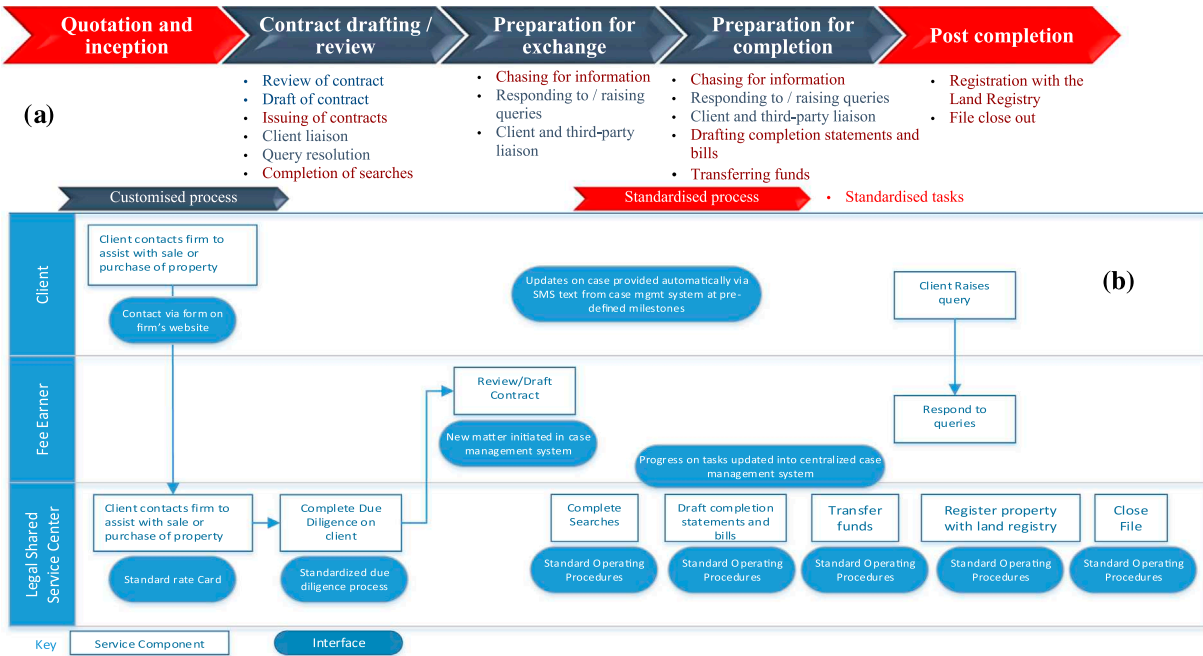


Figure 6. (a) Decomposition and (b) interfaces of modular legal processes.

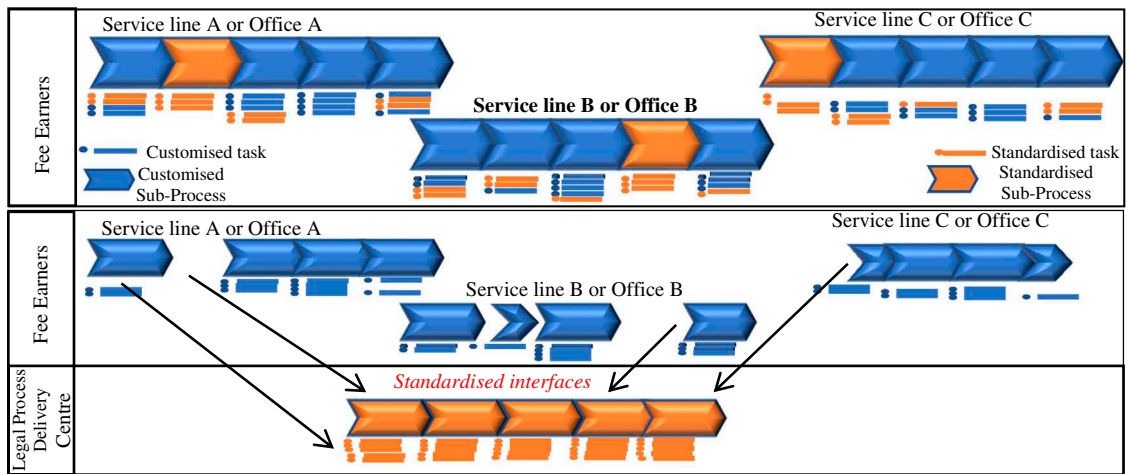


Figure 7. Illustration of centralisation of processes to a 'Legal Process Delivery Centre'.

Transition from an integral to modular process should start with the decomposition of core processes into distinct modular activities and sub-processes. This makes the total operation easier to conceptualise and handle (Bask et al. 2011). Useful process decomposition methods include use of value stream and process mapping analyses and classification of service components into standardised and customised groups. During the follow-up sessions at Firm C, we held a workshop to complete a detailed process map of simple legal processes. We analysed each of the process tasks and service components to identify whether it could be standardised, or whether it needed to retain a degree of customisability. Figure 6 shows how service process modularity can be achieved for the Conveyancing service of Firm C. As can be seen, there are considerable opportunities to standardise a significant number of simple legal processes. The implication of this is that the standardised components could be undertaken by less qualified, experienced and costly staff, rather than the trained fee-earners (solicitors). Figure 6(b) illustrates how the process components could be configured and coordinated via standard interfaces. Similar to the design of modular service offerings, the interfaces at the process level

can be enabled through online protocols that allow for the creation and utilisation of standard forms and procedures that can be deployed according to customer preferences.

4.3.3 Design of modular service supply chain architectures

While the conveyancing example illustrates how a simple legal service could be modularised at the process level, we also explored the scope for modularising a more complex legal service (e.g. litigation) at the supply chain modularity level. Similar findings regarding the extent to which law firms explore organisational modularisation through outsourcing of services emerged. Nine firms employ a hierarchical integral service supply chain structure, and only one firm outsources legal work to another business (a wholly owned subsidiary of the outsourcing firm). Figure 7 shows how a law firm operating in a modular manner could move the decentralised completion of standardised components by fee earners to a centralised shared-service centre (or a 'legal process delivery centre') responsible for paralegal supporting activities.

5. Discussion and conclusion

In this paper, we demonstrate how legal services can be modularised and delineate the role that the services supply chain strategy plays in the choice of the level of service modularisation. Congruent with the extant literature on supply chain modularity, we argue that the key to successful service modularisation is ensuring that there is coherence between the design of modular service packages, modular service processes, and supply chain modularity. Based on a critical reflection of salient conceptual issues governing service modularity and services supply chain management, we challenge the *mirroring hypothesis* which postulates that modular service designs have to be delivered by loosely coupled (modular) supply chains. Instead, we posit that a professional service organisation has several options when choosing between integral or modular service and supply chain designs. We further argued that the appropriate degree and level of modularisation of professional services should be determined by the key supply chain strategic decisions of service firms regarding their appropriate capacity management strategies, sourcing strategies, process and technology decisions, level of client contact and delivery mechanisms, and service delivery strategies. These decisions are determined by the strategic performance objectives of service firms.

In line with the aforementioned arguments, we propose a conceptual model that can be employed to identify the most appropriate supply chain strategy for modularisation of legal services. We used this model to analyse how different types of legal services can be modularised. For example, we present in Table 3 how a modular service supply chain strategy associated with moving from a traditional legal services delivery model to one focusing on the delivery of high volume/low variety services using a modular delivery approach can be developed. The high volume/low variety market requirement reflects the need for pre-packaged service bundles (Bask et al. 2011), which are designed to constrain flexibility and focus instead on standardised and low-cost offerings. We see this as an option that the more cost-focused clients will likely favour. The most important supply chain decision areas in this context are not governed by how qualified the staff is, but rather pertain to the organisation's ability to ensure dependability in delivery and sufficient staff understanding of the interfaces among different service delivery modes.

The findings yielded by our empirical study show that service modularity has not been embraced by the legal services industry at the level of service offering, within service processes or in the supply chain components. This may be due to several reasons, including cost, risk, process complexity and institutional factors. In particular, for services with low level of required customisation (such as mass transactions or standard contracts), law firms are presently over-customising (or understandardising) the delivery of legal services. We show that these types of legal services can be modularised by adopting integral modular designs or integral modular supply chains strategies, at all levels of service modularity. This can be done through appropriate decomposition of services into components, processes, standard interfaces and outsourcing of processes that are common to a wide range of different legal services to third parties.

By taking a supply chain strategic perspective on the modularisation of professional services regarding a company's capacity, sourcing and delivery strategy, process and technology choices and job design/resource planning, we also generated insights about the actual design of modular professional services. Our analysis of legal services that require medium to low level of customisation shows how these services can be decomposed into standard components. We also identified interfaces that would be appropriate for the design of modular legal services at the three levels of service modularity (offering, process and supply chain). Table 4 shows a summary of the findings resulting from our empirical research.

Regarding the actual modular service design, as Pekkarinen and Ulkuniemi (2008) observe, interfaces accommodate and enable substitution and exchange of components. The interfaces for the modularisation of legal services are likely

Table 3. Legal services modular service supply chain strategy for high volume/low variety services.

		Legal services supply chain decision areas				
		Capacity strategy	Sourcing strategy	Process and technology	Client contact and Channel strategy	Organisation and development strategy
Performance objectives	Quality			Determine modular interface protocols		Staff trained to deliver modules in a structured format
	<i>Actual output (conformance)</i>					
	<i>Perceived quality (soft issues)</i>					
	<i>Service delivery (expectations)</i>					
	Dependability	Technology focused		Driven by clear module design protocols	Driven by clear module design protocols	
	<i>Availability</i>					
	<i>Consistency</i>			Technology focused	Service modules delivered according to customer module selection	
	<i>Flexibility</i>					
	<i>Responsiveness</i>			Module delivery driven by client requests	Client time reduced due to standardised modular delivery	
	<i>Adaptability</i>	Technology focused				
<i>Variety</i>						
Speed						
<i>Timely completion</i>						
Cost	Technology focused		Module bundles based on client requests and service bundling	Driven by clearly defined module selection protocols	Staff reorganisation to follow modular service delivery	
<i>Value for money</i>						
<i>Process</i>						
<i>Efficiency</i>						

to be driven by information and communications technology systems. The findings of our research suggest that, as the modular delivery process is tested and validated, some of the established interfaces (particularly between customer entry into the process and its subsequent management within the modular service delivery operation) can be utilised for those professional services that currently require complex interactions (or interfaces) with highly paid legal professionals. We also note that, as an organisation becomes more comfortable with the design and delivery of modular services, it may be appropriate to offer a degree of flexibility, which will result in some of the flexibility intersections being occupied as deemed appropriate.

As a result of adopting this strategy, each independent module can be delivered in a standardised manner by appropriately allocated resources. Innovative new entrants have started developing simple, standardised legal service offerings with considerable success. With respect to supply chain modularisation through outsourcing, we identified viable choices for the creation of centralised legal process delivery centres. A scenario-based sourcing example based on the available data in the UK can illustrate the potential savings that could result from the creation of legal process delivery centres. While the initial set-up and on-going coordination costs for the creation of legal process delivery centres can be significant, the advantage of reduced production costs (i.e. as a result of the wage arbitrage difference) and economies of scale benefits could yield substantial net staff cost savings for a firm. A standard salary earned by a lawyer with 1–5 years of Post Qualified Experience in London is in the range of £70,000–£96,000 (Hudson 2017). If some of the activity of these lawyers could be moved to a paralegal resource elsewhere in the country or the world, the average savings per person would be substantial. Based on a prudent estimate of initial set-up and on-going coordination costs, moving just 10% of total lawyer workload to a Paralegal LPDC, a North-shore delivery centre in the UK or an offshore location, the net cost savings could be 2, 4 or 6%, respectively. Similarly, moving 20% of the workload to an alternative centre would yield net savings of 5, 10 and 13%, respectively.

The ability to standardise and centralise legal process delivery presents considerable cost saving opportunities, particularly since simplified, standardised tasks and sub-processes do not necessarily need to be delivered by highly skilled and expensive lawyers. Our findings suggest that market needs (i.e. the clients of law firms rather than the law firms themselves) create the primary impetus for the rapid increase in legal process outsourcers usage and are therefore driving the adoption of modularity at the organisational level.

Table 4. Effect of different service modular strategies on decomposability and interfaces of modular services.

	Integral modular design strategy		Integral modular supply chain design	
	Decomposability	Interfaces	Decomposability	Interfaces
Service offering	High to reflect customer specific requirements	<ul style="list-style-type: none"> • Standard forms for client needs assessment • Online protocols of communication with clients • Narrow division of labour for each sub-module of the service • Standardised means for release of service agreement 	Limited due to the integral design of the service	<ul style="list-style-type: none"> • Standard forms for client needs assessment • Online protocols of communication with clients for non-modular elements
Service process	High to reflect customer requirements	<ul style="list-style-type: none"> • Standard forms for client needs assessment 	Limited to high volume service provision	Limited to high volume service provision
Service supply chain	Easy, but limited since roles clearly defined and deviations from provision would increase costs	<ul style="list-style-type: none"> • Standard contractual clauses 	Easily added through outsourcing entire service modules or processes to third parties or service centres	<ul style="list-style-type: none"> • Each supplier has clearly defined roles with established design protocols • Standard contractual clauses • Common order fulfilment routines • Common resource planning routines
	Low Level of required customisation		High Level of required customisation	

5.1 Managerial implications

In this work, we contend that the move from a traditional to a modular service delivery for legal services is not simply a matter of service design, but a significant supply chain strategy decision. Our research shows that law firms over-customise the provision of legal services and overlook opportunities to modularise high-volume transactions. While this may not be an important issue for the high return legal services that require customised delivery and contingent relationships, over-customisation of mass transactions and standard contracts is likely put pressure on profit margins and thus affect the efficiency and quality of the provided service. We note that it is essential for service providers to consider that moving to a modular provision is not just a matter of simply procuring appropriate technology and sending staff to a training event. Firms should consider how their strategic objectives can be served by different modular service designs and select the most appropriate service supply chain architectures.

To assist with these decisions, we propose a modular supply chain strategy framework, which senior managers can use to articulate the appropriate changes to both performance objective positioning and how such positioning can usefully identify the critical decision area intersections. In Appendix 2, we provide an example of application of this framework as a diagnostic tool to identify areas of improvement in modular service design. Directions for managers on how to adopt service modularity principles are provided in Appendix 3.

5.2 Limitations and future research

The aim of this investigation was to explore the importance and implications of adopting modular principles within a services context. While we acknowledge that the application of modularity in the service sector has been a subject of considerable interest in recent studies, we nonetheless recognise the need to adopt a strategic lens and explore the decisions that

need to be considered when moving from a non-modular to a modular service provision. Specifically, we advocate for further longitudinal studies on this topic, as this approach would allow monitoring the development stages of service modularisation over a period of time. As a result, it would be possible to observe the learning process and subsequent application of the knowledge gained to the effective development of modular solutions within a range of services.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

- Alam, I., and C. Perry. 2002. "A Customer-oriented New Service Development Process." *Journal of Services Marketing* 16 (6): 515–534.
- Anderson, E. W., C. Fornell, and R. T. Rust. 1997. "Customer Satisfaction, Productivity, and Profitability: Differences Between Goods and Services." *Marketing Science* 16 (2): 129–145.
- Asan, U., S. Polat, and S. Serdar. 2004. "An Integrated Method for Designing Modular Products." *Journal of Manufacturing Technology Management* 15 (1): 29–49.
- Baldwin, C. Y., and K. B. Clark. 1997. "Managing in an Age of Modularity." *Harvard Business Review* 75 (5): 84.
- Baldwin, C. Y., and K. B. Clark. 2000. *The Power of Modularity, Design Rules*. vol. 1. Cambridge, MA: MIT Press.
- Bask, A., M. Lipponen, M. Rajahonka, and M. Tinnilä. 2010. "The Concept of Modularity: Diffusion from Manufacturing to Service Production." *Journal of Manufacturing Technology Management* 21 (3): 355–375.
- Bask, A., M. Lipponen, M. Rajahonka, and M. Tinnilä. 2011. "Framework for Modularity and Customization: Service Perspective." *Journal of Business & Industrial Marketing* 26 (5): 306–319.
- Bettencourt, L. A., A. L. Ostrom, S. W. Brown, and R. I. Roundtree. 2002. "Client Co-production in Knowledge-intensive Business Services." *California Management Review* 44 (4): 100–128.
- Brax, S. A., A. Bask, J. Hsuan, and C. Voss. 2017. "Service Modularity and Architecture – An Overview and Research Agenda." *International Journal of Operations & Production Management* 37 (6): 686–702.
- Brusoni, S., A. Prencipe, and K. Pavitt. 2001. "Knowledge Specialization, Organizational Coupling, and the Boundaries of the Firm: Why do Firms Know more than They Make?" *Administrative Science Quarterly* 46 (4): 597–621.
- Campagnolo, D., and A. Camuffo. 2010. "The Concept of Modularity in Management Studies: A Literature Review." *International Journal of Management Reviews* 12 (3): 259–283.
- Caridi, M., M. Pero, and A. Sianesi. 2012. "Linking Product Modularity and Innovativeness to Supply Chain Management in the Italian Furniture Industry." *International Journal of Production Economics* 136 (1): 207–217.
- Chang, S. Y., and T. Y. Yeh. 2013. "Optimal Order Quantity and Product Modularity for a Two-echelon Returnable Supply Chain." *International Journal of Production Research* 51 (17): 5210–5220.
- Colfer, L., and C. Y. Baldwin. 2010. "The Mirroring Hypothesis: Theory, Evidence and Exceptions." *Harvard Business School Finance Working Paper*, (10-058).
- De Blok, C., K. Luijckx, B. Meijboom, and J. Schols. 2010. "Modular Care and Service Packages for Independently Living Elderly." *International Journal of Operations & Production Management* 30 (1): 75–97.
- De Blok, C., B. Meijboom, K. Luijckx, J. Schols, and R. Schroeder. 2014. "Interfaces in Service Modularity: A Typology Developed in Modular Health Care Provision." *Journal of Operations Management* 32 (4): 175–189.
- Empson, L., ed. 2007. *Managing the Modern Law Firm: New Challenges, New Perspectives*. Oxford: OUP
- Fine, C. H. 1998. *Clockspeed: Winning Industry Control in the Age of Temporary Advantage*. New York: Perseus Books
- Fine, C. H. 2005. "Are You Modular or Integral? Be Sure Your Supply Chain Knows." *Strategy+Business* 39 (2): 1–8.
- Frandsen, T. 2017. "Evolution of Modularity Literature: A 25-Year Bibliometric Analysis." *International Journal of Operations & Production Management* 37 (6): 703–747.
- Giannakis, M. 2011. "Management of Service Supply Chains with a Service-oriented Reference Model: The Case of Management Consulting." *Supply Chain Management: An International Journal* 16 (5): 346–361.
- Gualandris, J., and M. Kalchschmidt. 2013. "Product and Process Modularity: Improving Flexibility and Reducing Supplier Failure Risk." *International Journal of Production Research* 51 (19): 5757–5770.
- Harland, C. M., R. C. Lamming, and P. D. Cousins. 1999. "Developing the Concept of Supply Strategy." *International Journal of Operations & Production Management* 19 (7): 650–674.

- Hodgart Associates. 2014. "Key Challenges Facing the UK Legal Market. Accessed April 20, 2015. <http://www.hodgartassociates.com/files/Key%20Challenges%20-%20UK%20Law%202014.pdf>
- Hudson. 2017. "Salary and Rates Guide London". Accessed October 2, 2017. https://uk.hudson.com/Portals/UK/documents/SalarySurveys/UK_Salary_Guides_2017_Legal_London.pdf
- Jacobs, M., S. K. Vickery, and C. Droge. 2007. "The Effects of Product Modularity on Competitive Performance." *International Journal of Operations & Production Management* 27 (10): 1046–1068.
- Karim, S. 2006. "Modularity in Organizational Structure: The Reconfiguration of Internally Developed and Acquired Business Units." *Strategic Management Journal* 27 (9): 799–823.
- Kellogg, D. L., and W. Nie. 1995. "A Framework for Strategic Service Management." *Journal of Operations Management* 13 (4): 323–337.
- Lewis, M. A., and A. D. Brown. 2012. "How Different is Professional Service Operations Management?" *Journal of Operations Management* 30: 1–11.
- Machuca, J., M. D. M. González-Zamora, and V. G. Aguilar-Escobar. 2007. "Service Operations Management Research." *Journal of Operations Management* 25 (3): 585–603.
- Mandel, G. 2017. *Evolution in Response to Technological Change, Handbook of Law, Regulation and Technology*. Oxford: Oxford University Press.
- Mendes, J. M., P. Leitão, A. W. Colombo, and F. Restivo. 2012. "High-level Petri Nets for the Process Description and Control in Service-oriented Manufacturing Systems." *International Journal of Production Research* 50 (6): 1650–1665.
- Meyer, M. H., and A. DeTore. 1999. "Product Development for Services." *The Academy of Management Executive* 13 (3): 64–76.
- Mikkola, J. H. 2006. "Capturing the Degree of Modularity Embedded in Product Architectures." *Journal of Product Innovation Management* 23 (2): 128–146.
- Miles, B., and Huberman, A. M. 1994. *Qualitative Data Analysis, An Expanded Sourcebook*. 2nd ed. Thousand Oaks, CA: Sage Publications.
- Nätti, S., P. Ulkuniemi, and S. Pekkarinen. 2017. "Implementing Modularization in Professional Services – The Influence of Varied Knowledge Environments." *Knowledge and Process Management* 24 (2): 125–138.
- Pekkarinen, S., and P. Ulkuniemi. 2008. "Modularity in Developing Business Services by Platform Approach." *The International Journal of Logistics Management* 19 (1): 84–103.
- Rahikka, E., P. Ulkuniemi, and S. Pekkarinen. 2011. "Developing the Value Perception of the Business Customer through Service Modularity." *Journal of Business & Industrial Marketing* 26 (5): 357–367.
- Regan, Milton C., Jr., P. T. Heenan. 2010. "Supply Chains and Porous Boundaries: The Disaggregation of Legal Services." *Fordham Law Review* 78: 2137–2191, Georgetown Law and Economics Research Paper No. 11-04.
- Roth, A., and L. J. Menor. 2003. "Insights into Service Operations Management: A Research Agenda." *Production and Operations Management* 12 (2): 145–164.
- Sako, M. 2003. "Modularity and Outsourcing: The Nature of Co-evolution of Product Architecture and Organization Architecture in the Global Automotive Industry." In *The Business of Systems Integration*, edited by A. Prencipe, A. Davies, and M. Hobday, 229–253. Oxford: Oxford University Press.
- Sako, M. 2015. "Outsourcing and Offshoring of Professional Services." In *The Oxford Handbook of Professional Service Firms*, edited by B. Hinings, D. Muzio, J. Broschak, and L. Empson, 326–350. Oxford: Oxford University Press.
- Sanchez, R., and J. T. Mahoney. 1996. "Modularity, Flexibility, and Knowledge Management in Product and Organization Design." *Strategic Management Journal* 17 (S2): 63–76.
- Schilling, M. A. 2000. "Toward a General Modular Systems Theory and its Application to Interfirm Product Modularity." *Academy of Management Review* 25 (2): 312–334.
- Schmenner, R. W. 2004. "Service Businesses and Productivity." *Decision Sciences* 35 (3): 333–347.
- Shen, J., J. A. Erkoyuncu, R. Roy, and B. Wu. 2017. "A Framework for Cost Evaluation in Product Service System Configuration." *International Journal of Production Research* 55: 1–25.
- Silvestro, R., L. Fitzgerald, R. Johnston, and C. Voss. 1992. "Towards a Classification of Service Processes." *International Journal of Service Industry Management* 3 (3): 62–75.
- Slack, N., and M. Lewis. 2015. *Operations Strategy*. New York: Financial Times/Prentice Hall.
- State Bar of Wisconsin. 2014. *The New Normal: The Business of Law: The Challenges Facing Law Firms*. Accessed April 20, 2017. <http://www.wisbar.org/SiteCollectionDocuments/News/FINAL-report-July-2011.pdf>
- Susskind, R. 2010. *The End of Lawyers: Rethinking the Nature of Legal Services*. Oxford: Oxford University Press.
- Talluri, S., M. K. Kim, and T. Schoenherr. 2013. "The Relationship between Operating Efficiency and Service Quality: Are they Compatible?" *International Journal of Production Research* 51 (8): 2548–2567.
- Tinnilä, M., and A. Vepsäläinen. 1995. "A Model for Strategic Repositioning of Service Processes." *International Journal of Service Industry Management* 6 (4): 57–80.
- Ulrich, K. 1995. "The Role of Product Architecture in the Manufacturing Firm." *Research Policy* 24 (3): 419–440.

- Vargo, S. L., P. P. Maglio, and M. A. Akaka. 2008. "On Value and Value Co-creation: A Service Systems and Service Logic Perspective." *European Management Journal* 26 (3): 145–152.
- Vickery, S. K., Y. A. Bolumole, M. J. Castel, and R. J. Calantone. 2015. "The Effects of Product Modularity on Launch Speed." *International Journal of Production Research* 53 (17): 5369–5381.
- Vickery, S. K., X. Koufteros, C. Dröge, and R. Calantone. 2016. "Product Modularity, Process Modularity, and New Product Introduction Performance: Does Complexity Matter?" *Production and Operations Management* 25 (4): 751–770.
- Voordijk, H., B. Meijboom, and J. de Haan. 2006. "Modularity in Supply Chains: A Multiple Case Study in the Construction Industry." *International Journal of Operations & Production Management* 26 (6): 600–618.
- Voss, C. 2009. "Case Research in Operations Management." In *Researching Operations Management*, edited by C. Karlsson, 169–196. New York: Routledge.
- Voss, C. A., and J. Hsuan. 2009. "Service Architecture and Modularity." *Decision Sciences* 40 (3): 541–569.
- Wang, P. P., X. G. Ming, D. Li, F. B. Kong, L. Wang, and Z. Y. Wu. 2011. "Status Review and Research Strategies on Product-service Systems." *International Journal of Production Research* 49 (22): 6863–6883.
- Wemmerlöv, U. 1990. "A Taxonomy for Service Processes and its Implications for System Design." *International Journal of Service Industry Management* 1 (3): 20–40.
- Yin, R. K. 2013. *Case Study Research: Design and Applications*. 5th ed. Thousand Oaks, CA: Sage Publications.

Appendix 1. Example of completed supply chain strategy framework

The matrix below illustrates how the supply chain strategy conceptual framework was used as a high-level diagnostic tool to identify areas for improvement in either particular decision areas, performance objectives or both. The colour-coded scoring mechanism (although subjective) gives an indicative method of prioritisation.

Level Service Performance Criteria	CAPACITY STRATEGY			SOURCING STRATEGY			PROCESS AND TECHNOLOGY			CLIENT CONTACT AND CHANNEL STRATEGY					PEOPLE STRATEGY				
	Capacity planning and re-allocating	Facilities and office strategy	Core legal processes	Back office / Support Services Sourcing Strategy	Process	Technology	Performance measurement, design	Job design	Client contact strategy	Revenue model / Incentive structure	Use of CRM	Channel strategy	Quality Management	Training and Skills	Management Structure	Decision making structure	Knowledge Management	Talent management	
Actual / Technical Quality																			
Combinative Performance	2	2			1	1	2	1					1	1			1	14	
Information content	2						2						2				1	18	
Expedites			2				1							1			2	17	
Investigability							1										1	13	
Quality of Service							1											10	
Client Service							2											17	
Alternative routes																			
Features and range of service																			
Value for Money / Efficiency																			
Efficient	3	2			2	1	2	2	2	2	2	1	1	2	2	2	1	18	
Efficient model	2	2			1	1	2	1	2	2	2			2				17	
Client contact channel	2	1			2													16	
Location / Geographic reach	2	2																20	
Capable to deliver	2	2			2	2												20	
Speed																			
Responsiveness	3	2			2	1	3	2	2	2	2							21	
Task completion	3	2			2	1	3	2	2	2	2							21	
Dependability / Reliability																			
Flexibility	2	2			2	2	2	2	2	2	2							20	
Level of discretion	2,3	18	22	20	16	13	23	15	16	18	20	13	1	10	20	20	17	11	

The scoring scale consists of:
 1 – No issues noted
 2 – Some areas for improvement
 3 – Significant improvement required

Appendix 2. Example of data analysis form – example for Firm H

		Contingent relationships				Customised delivery				Standard contracts				Mass transactions			
		Process type		Technology		Process type		Technology		Process type		Technology		Process type		Technology	
		For recording		Job design		For recording		Job design		For recording		Job design		For recording		Job design	
		Broad, flexible		Client contact strategy		Broad, flexible		Client contact strategy		Broad, flexible		Client contact strategy		Broad, flexible		Client contact strategy	
		Face-to-face		Channel strategy		Face-to-face		Channel strategy		Face-to-face		Channel strategy		Face-to-face		Channel strategy	
		Internal hierarchy		Internal hierarchy		Internal hierarchy		Internal hierarchy		Internal hierarchy		Internal hierarchy		Internal hierarchy		Internal hierarchy	
Long thin																	
For automation																	
Narrow, inflexible																	
Virtual																	
Market network																	
Long thin																	
For automation																	
Narrow, inflexible																	
Virtual																	
Market network																	
Long thin																	
For automation																	
Narrow, inflexible																	
Virtual																	
Market network																	

High <----- Degree of standardisation -----> Low

High <----- Degree of standardisation -----> Low

Classification key:

		No process disaggregation	Some disaggregation	Considerable disaggregation	Process disaggregated	Short fat
Long thin		Large scale, inflexible tech for recording	Flexible tech for recording	Inflexible tech for automation	Small scale, flexible tech for automation	For recording
For automation		Broad, flexible, task-based	Some task specialisation	Some process specialisation	Narrow, inflexible, process based	For recording
Narrow, inflexible		Completely face-to-face	Predominantly face-to-face	Predominantly virtual	Completely virtual	Broad, flexible
Virtual		Work sourced via Partners	Agents or alliances	Field personnel	Work sourced from market	Face-to-face
Market network						Internal hierarchy

The green boxes indicate the theoretical optimum positioning for service delivery. The black boxes indicate where the particular firm has been rated in each area. The example here illustrates that Firm H that predominantly delivers services which are classified as ‘Standard Contracts’ has been rated as having low levels of standardisation in all areas, particularly; Process Type, Job Design and Channel Strategy. This results in Firm H being plotted ‘above the diagonal’ and suggests that it is delivering services in an under-standardised manner. This analysis was completed for all 10 participating firms.

Appendix 3. Practical steps for a law firm to adopt modularity principles

	Operations Decision Areas	Strategies for a Modular law firm
1	Capacity Strategy	<ul style="list-style-type: none"> • Investigate more flexible staffing options • Develop a centralised shared service-centre model to increase economies of scale • Smaller proportion of lawyers to non-lawyers • Use of flexible labour • Greater use of temporary resources • Multi-site channels to market, encompassing virtual channels with centralised delivery capability.
2	Sourcing Strategy	<ul style="list-style-type: none"> • Greater use of outsourced / north-shore resource. Potentially offshore with time. • Virtual, home-based workers to feature • Outsourced non-core functions
3	Process and Technology Strategy	<ul style="list-style-type: none"> • Develop modular legal processes • Make a distinction between customised and standardised modules • Look for 'off-the-diagonal' improvements where standardisation can be increased without impacting customisation • Aim for repeatable, continuous processes • Use larger scale, automation technology • Increased use of cloud-based technology to enable virtual and modular working • Develop a balance of financial and non-financial measures • Reduced focus on utilisation. More on throughput. • More external focus measures. • Development of actual quality measures monitored in the market. • Define more narrow roles allowing for greater specialisation • 'Long/thin' rather than 'Short/fat' job design • Move from task-based to process-based roles • External stimuli used for motivation
4	Client Contact and Channel Strategy	<ul style="list-style-type: none"> • Increasing use of virtual and web channels • Increased reliance on CRM • Migration away from internal hierarchy channels and towards market networks.
5	People Strategy	<ul style="list-style-type: none"> • Incentives based on more than just progression • Focus Quality Assurance rather than Quality Control • Less homogenous, more specialised • More corporate than collegiate • Systemised